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ABSTRACT

A battery of 10 intelligence tests was administered to 22 subjects under standard conditions. After the testing session the degree of perceived similarity between 5 tests of the battery was to be estimated with regard to: (1) the kind of intellectual activity required by the tests, and (b) difficulty. Estimated qualitative similarity, according to (1) above was found to be a simple function of intertest correlation as determined from another group of 128 subjects. A correlation of 0.48 was found between estimates of qualitative simularity and similarity with regard to perceived difficulty and a correlation of 0.40 between the latter similarity variable and intertest correlation. When removing the effects of similarity with regard to perceived difficulty on the correlation between intertest correlation and estimated qualitative similarity ($r=0.79$), a partial coefficient of correlation of 0.74 was yielded, indicating that perceived difficulty accounts for only 12 percent of the association of 0.79 present. (Author)

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OSWALD BRATFISCH

EXPERIENCED INTELLECTUAL ACTIVITY AND PERCEIVED DIFFICULTY OF INTELLIGENCE TESTS

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Bratfisch, O. Experienced intellectual activity and perceived difficulty of intelligence tests. Reports from the Institute of Applied Psychology, the University of Stockholm. 1972, No. 30. - A battery of 10 intelligence tests was administered to 22 subjects under standard conditions. After the testing session the degree of perceived similarity between 5 tests of the battery was to be estimated with regard to (a) the kind of intellectual activity required by the tests and (b) difficulty. Estimated qualitative similarity (according to (a) above) was found to be a simple function of intertest correlation as determined from another group of 128 subjects. A correlation of 0.48 was found between estimates of qualitative similarity and similarity with regard to perceived difficulty and a correlation of 0.40 between the latter similarity variable and intertest correlation. When removing the effects of similarity with regard to perceived difficulty on the correlation between intertest correlation and estimated qualitative similarity ($r = 0.79$), a partial coefficient of correlation of 0.74 was yielded, indicating that perceived difficulty accounts for only 12 percent of the association of 0.79 present.

Introduction

In recent years a number of studies have been concerned with the perception of various performance activities. In general, the primary interest was in the relation between some defined aspect of a performance activity as perceived by the performing subjects themselves and corresponding "objective" measurements being of a physical, physiological or psychological (though non-perceptive) nature.

Probably the first serious attempts to study performance on the perceptual level were undertaken in the area of physical work (e.g. Borg, 1962; Borg & Dahlström, 1959, 1960), in which field also the practical impacts of the obtained findings have become obvious; for a survey see e.g. Borg,(1970, 1971). Later on the perception of

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performance activities in fields like motorskill (Bratfisch, Dornić & Borg, 1970), immediate memory (Borg, Bratfisch & Dornić, 1971a) and visual perception (Borg, Bratfisch & Dornić, 1971b) were studied. More recently a number of investigations have been concerned with the perception of intellectual performance. The majority of the latter kind of studies have dealt with perceived difficulty (Borg, 1966, 1969; Backman & Wedman, 1971; Munz & Jacobs, 1971; Bratfisch, Borg & Dornić, 1972; Bratfisch, Dornić & Borg, 1972), while some others were interested in the dimensionality of intellectual performance based on the perception of the intellectual activities involved (Bratfisch & Ekman, 1969; Bratfisch, 1971).

The present study is once more concerned with the perception of intellectual performance and can be regarded as a continuation of the previous investigations on the topic combining both features mentioned, namely the perceived difficulty as well as the perceived quality (intellectual activity involved) of intellectual tasks.

A very close correspondence between subjective intelligence factors, based on the perception of similarity between tasks with regard to the intellectual activities involved, and objective performance factors, extracted from analyses of correlation data, was found earlier (Bratfisch & Ekman, op.cit., Bratfisch, op.cit.). It could also be demonstrated there that the perception of qualitative similarity between the tasks was not due to similarity with regard to difficulty as expressed by differences between performance scores. However, it might be due to the perception of the difficulty of the tasks. Thus, the major question to be illuminated in the present study was: what is the relation between perceived qualitative similarity and similarity with regard to perceived difficulty of intellectual performance activities? As the investigation of this question involves a complex stimulus situation measurements concerning the subjects' perception of uncertainty about their own estimates of similarity were considered to be of additional interest.

Method

The stimulus situation

Ten factor tests from a standardized intelligence test battery (the "Delta Battery" of the Institute of Applied Psychology; manual, 1971) were used as stimuli in the experiment. All the tests were conventional in character and may, hence, be characterized by names only. In the following presentation the tests are arranged according to the factors they represent: the denotion of factors follows the system introduced by Thurstone (1938) and Thurstone & Thurstone (1941).

	Test	Factor
(1)	Synonyms	Verbal comprehension (V)
(2)	Opposites	"
(3)	Identical letters	Perceptual speed (P)
(4)	Identical numbers	"
(5)	Multiplications	Numerical facility (N)
(6)	Mixed computations	"
(7)	Number series	Reasoning ability (R)
(8)	Matrices	"
(9)	Levers	Spatial ability (S)
(10)	Surface development	"

The tests were administered to the subjects under standard conditions. The testing session served the purpose, among other things, of making the subjects thoroughly familiar with the tests and thus providing them with a basis for judging what kind of intellectual performance was required by any particular test and what degree of difficulty they might have.

Estimation of test difficulty

After the testing session the subjects were asked to estimate the perceived difficulty of the various tests on a symmetrical scale of nine categories with verbal expression labels as follows: 1 - very, very easy; 2 - very easy; 3 - easy; 4 - rather easy; 5 - neither easy nor difficult; 6 - rather difficult; 7 - difficult; 8 - very difficult; 9 - very, very difficult. They were instructed to base their judgements on their spontaneous, entirely personal impression without considering what other people might experience in this connection.

To study estimated test difficulty was not a primary aim of the present investigation. However, as estimates of test difficulty were readily obtainable, they were included in the experimental proceedings. With reference to the positive experience of category estimation made in earlier studies on perceived difficulty of individual test items (e.g. Bratfisch, Borg & Dornić, 1972) this method was preferred to other non time-consuming methods like e.g. magnitude estimation.

Similarity estimation

After the estimates of test difficulty subjects were given a break of about one hour before proceeding with the second part of the experiment. Five tests, one for each of the factors V, P, N, R, and S, sampled from the above described battery, served as stimuli in this part of the experiment, where similarity between the tests was to be estimated from two aspects: similarity with regard to perceived difficulty and similarity with regard to the intellectual ability perceived to be involved when dealing with the various tasks. The five tests were: 1. Opposites, 2. Identical letters, 3. Mixed computa-

tions, 4. Matrices, and 5. Surface development. A reduction of stimuli turned out to be necessary as the usage of all 10 tests as stimuli instead of 5 would have prolonged the experiment by about 1 1/2 hours, which was impossible to carry out in practice; the experiment as it was performed actually lasted around 7 hours.

The names of the tests were presented in all 10 possible pairs on printed answer sheets. The order of pairs was randomized differently for the two kinds of similarity estimates to be given.

In the "difficulty" condition the subjects were instructed to consider each pair of tests in turn and to estimate the degree of similarity between tests with regard to perceived difficulty. They were again asked to base their judgements on their immediate, entirely personal impression without considering what other people might perceive. The estimates of similarity were to be given on a percentage scale, 100 representing identity and 0 denoting no similarity at all. The percept of each pair perceived as most difficult was to be pointed out in order to be able to erect a scale of subjective difficulty. The subjects were given a number of training trials, with the remaining 5 tests not selected, in order to ensure a correct understanding of the instructions; the names of the ten tests together with a sample item from each test were placed in front of the subjects as an aid to memory. In addition, to get a hint of the subjects' momentary uncertainty concerning the adequacy of the given estimates, so called interval estimates were to be delivered (see Hallsten, 1971a). This implies that subjects are asked to report the smallest interval within which their percept is located with a certain degree of personal credibility. In the present case this was done by asking the subjects to specify the interval that they were almost definitely certain included their percept of similarity between the pairs of stimuli. Thus, three estimates were given for each pair of stimuli: a "point" - similarity estimate as well as an estimate of the lowest and an estimate of the highest figure connected with a certain percept.

In the "quality" condition the subjects were instructed to consider again each pair of tests in turn and to estimate the degree of similarity between the kinds of intellectual ability involved when dealing with the tasks of these tests. They were carefully instructed to base their judgements entirely on qualitative similarity between the tests, disregarding possible perceived differences in difficulty. Otherwise the procedure was the same as in the difficulty condition.

One half of the subjects estimated qualitative similarity first and the other half similarity with regard to difficulty. Both conditions of similarity estimation were carried out individually whereas the testing session and the direct estimates of difficulty were performed in groups of 3-6 persons.

Subjects

22 subjects participated in the experiment. All of them were vocational guidance clients of the Institute of Applied Psychology, and the experiment was conducted within the regular guidance program. The age of the subjects ranged from 18 - 47 years, the median age being 25 years. There were 12 male and 10 female subjects. All

of them had elementary (9 years) schooling only. A homogeneous group of this composition was preferred for two reasons: the subjects should be unsophisticated in intelligence theory, and they should represent a population for which the tests were primarily constructed and standardized. Moreover, to qualify as a subject a minimum averaged test performance of stanine 5 turned out to be a necessary requirement as the procedure of similarity estimation in the two outlined respects was a rather demanding task in itself.

Results

Similarity estimation, interval estimates, coefficients of correlation

Medians and semi-interquartile ranges were computed for the individual "point"-estimates of similarity of each pair of tests due to some skewed distributions. These statistics are shown in Tables 1A and 1B for the quality condition and the perceived difficulty condition, respectively, together with the corresponding statistics concerning the interval estimates, i.e. the lowest and the highest figure subjects could still connect with a given percept. Moreover, arithmetic means of as well as ratios between the median lower and the median upper estimates of each pair of stimuli are given in these tables. Finally, coefficients of intertest correlation, obtained from another group of 128 vocational guidance clients, are seen in Tables 1A and 1B. In the following, "point"-estimates will be referred to just as "similarity estimates", while the two interval estimates will be called "upper" and "lower" estimates.

Table 1A. Medians (Mdn) and semi-interquartile ranges (Q) computed from experimental estimates. The data refer to similarity with regard to intellectual ability involved when dealing with the various tests. L = median lower estimates, U = median upper estimates, S = median similarity estimates; Op = Opposites, IL = Identical letters, MC = Mixed computations, Ma = Matrices, SuD = Surface development, r = intertest correlation.

Pair of tests	Mdn_L	Q_L	Mdn_U	Q_U	$\frac{Mdn_L + Mdn_U}{2}$	Mdn_S	Q_S	Mdn_L/Mdn_U	r
Op - IL	28.5	28.5	37.5	35.0	33.00	30.0	29.0	0.76	0.40
Op - MC	15.0	24.5	28.5	32.5	21.50	25.0	22.5	0.53	0.24
Op - Ma	36.0	20.0	55.0	22.5	45.50	45.0	22.5	0.65	0.47
Op - SuD	12.5	12.5	22.5	19.0	17.50	17.5	14.5	0.56	0.27
IL - MC	27.5	34.5	51.0	35.0	39.25	40.0	36.5	0.54	0.32
IL - Ma	35.5	23.5	52.5	35.0	43.75	50.0	27.5	0.67	0.51
IL - SuD	5.0	10.0	22.5	20.0	13.75	15.0	13.5	0.22	0.23
MC - Ma	15.0	14.0	28.5	22.5	21.75	22.5	21.0	0.53	0.32
MC - SuD	15.0	14.5	26.5	28.5	20.75	19.5	23.5	0.57	0.13
Ma - SuD	44.0	35.0	62.5	25.0	53.25	50.0	30.5	0.70	0.36

Table 1B. Medians (Mdn) and semi-interquartile ranges (Q) computed from experimental estimates. The data refer to similarity with regard to perceived difficulty. For an explanation of the abbreviations used see table 1A.

Pair of tests	Mdn_L	Q_L	Mdn_U	Q_U	$\frac{Mdn_L + Mdn_U}{2}$	Mdn_S	Q_S	Mdn_L/Mdn_U	r
Op - IL	40.0	27.5	62.5	30.0	51.25	50.0	30.0	0.64	0.40
Op - MC	46.5	25.0	60.0	20.0	53.25	53.0	25.0	0.78	0.24
Op - Ma	52.5	20.0	75.0	17.5	63.75	65.0	17.5	0.70	0.47
Op - SuD	35.0	15.0	60.0	15.0	47.50	50.0	15.0	0.58	0.27
IL - MC	60.0	20.0	81.0	20.0	70.50	75.0	20.0	0.74	0.32
IL - Ma	45.0	20.0	60.0	17.5	52.50	50.0	25.0	0.75	0.51
IL - SuD	32.5	17.5	60.0	16.0	46.25	46.0	17.5	0.54	0.23
MC - Ma	43.5	17.5	60.0	15.0	51.75	50.0	15.0	0.73	0.32
MC - SuD	28.5	12.5	51.0	15.0	39.75	40.0	12.5	0.56	0.13
Ma - SuD	50.0	20.0	70.0	17.5	60.00	50.0	17.5	0.71	0.36

Scales of estimated test difficulty, test performance

Table 2 shows under the heading "direct scaling" means of the experimental estimates of the difficulty of the 10 tests applied as stimuli obtained by the category scaling. For comparative purposes a scale of subjective difficulty was constructed, assuming Thurstone's Case V, on the basis of rank order information obtained as part of the similarity estimates concerning the "difficulty" condition. This scale is also seen in Table 2 under the heading "indirect scaling" together with the subjects' mean performance scores expressed in stanine units obtained by the standardization group (Delta Battery, 1971).

Table 2. Scales of subjective difficulty, constructed from experimental data, test scores.

Test	Direct scaling	Indirect scaling	Test scores
Synonyms	3.77	-	6.45
Opposites	4.45	4.19	7.64
Identical letters	2.77	2.40	4.95
Identical numbers	2.36	-	6.41
Multiplications	4.18	-	5.18
Mixed computations	4.05	3.60	5.55
Number series	5.32	-	5.50
Matrices	4.91	4.91	5.73
Levers	6.18	-	5.73
Surface development	6.18	5.84	5.59

Uncertainty in similarity estimation

From both Tables 1A and 1B it can be seen that the inter-individual momentary precision of the estimates of similarity as expressed by the ratio between the median lower and the median upper estimates of each pair of stimuli is in most cases quite high. Such statistics may be regarded as an expression for the subjects' own uncertainty in connection with a given percept assuming equality of the individual density functions and equality of the individual levels of credibility behind the estimates of similarity. A ratio of 1.00 would mean that the subjects on an average felt positive about the adequacy of the figure ascribed to a given pair of stimuli; a decreasing degree of precision is expressed by decreasing ratios. The relatively high degree of precision throughout in the estimates obtained is interesting in the light of results from studies on perceived confidence limits of estimates of physically simple stimuli like loudness and line length (e.g. Hallsten, 1971b, 1971c). In these studies a somewhat lower degree of precision in estimates was found than in the present study which certainly can be said to have involved a complex stimulation. On the other hand, however, subjects might just have calculated the limits instead of expressing their experience numerically. When comparing the arithmetic means of the interval estimates ($Mdn_L + Mdn_U/2$) with the corresponding median similarity estimates (S) in Tables 1A and 1B a very close conformity can be noticed; the two kinds of statistics differ but little.

Another way of analyzing the inter-individual uncertainty would be to examine the relation between the inter-individual variability in the similarity estimates and the corresponding central measurements. This relation has earlier been found to be described by an inverse U-shaped trend, probably of elliptic character (Ekman & Künnapas, 1969). The present data, however, are not suitable for revealing such a trend. This is due partly to the few observations available (usually a considerable scatter around the fitted curve is found) and partly to the fact that the estimates range only from 15 to 50 with regard to the quality condition and from 40 to 75 as far as the quantity condition is concerned. With a range of 15 - 50 we would expect inter-individual variability to increase with increasing medians, which by and large is the case (cf Table 1A), and with a range of 40 - 75 we would expect the differences in variability between estimates just not to be too great; the semi-interquartile ranges of the similarity estimates seen in Table 1B seem on the whole not to be contradictory to this expectation.

If the two above outlined indices of uncertainty would be expressive for the same underlying phenomena they would be negatively related to each other (Hallsten, 1971a). However, as can be seen in Tables 1A and 1B, this is not the case in the present investigation. This problem is worth studying in more purely methodoligcal research.

Similarity and correlation

The medians of the similarity estimates with regard to the quality condition, divided by 100, have been plotted against coefficients of correlation in Fig. 1A (cf Table 1A). For comparison, the same kind of data plotted from an earlier study (Bratfisch & Ekman, 1969) is seen in Fig. 1B. In that study qualitative similarity between ten tests (identical with those of the present study) was to

be estimated. Thus 45 pairs of stimuli were judged compared to 10 in the present study. The 10 points in Fig. 1B corresponding to those in Fig. 1A are represented by filled circles. In the cited study the trend of data could be brought out more clearly by means of an averaging procedure; this trend is seen in Fig. 1C.

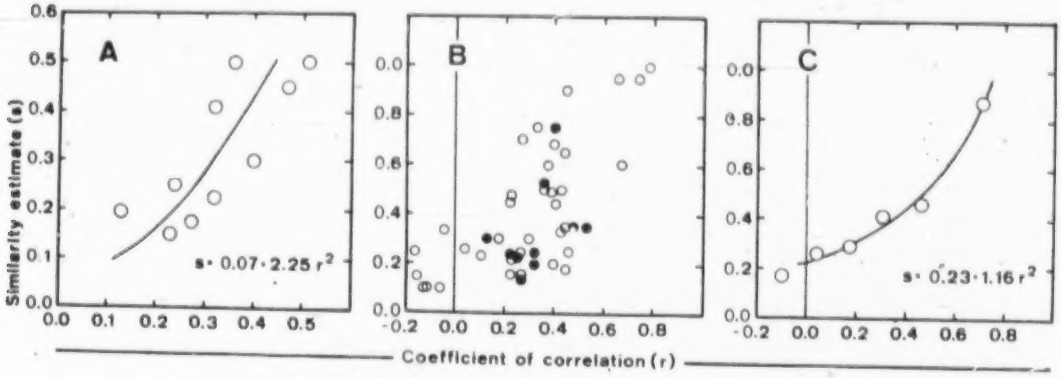

Fig. 1. Qualitative similarity estimate as a function of coefficient of correlation. Diagram A refers to data from the present experiment, Diagrams B and C show the results from an earlier study (Bratfisch & Ekman, 1969). The curves drawn in Diagrams A and C represent Equation 1.

The trend of the data in Fig. 1A, i. e. the relation between qualitative similarity estimates and corresponding coefficients of correlation, may be described by the equation

$$s = a + br^2 \qquad (1)$$

where s refers to qualitative similarity and r to correlation; a and b are empirical constants. This particular mathematical function was applied to the present data with reference to results from two earlier studies on the present topic (Bratfisch & Ekman, 1969; Bratfisch, 1971) and from one partly analogous study concerning personality traits (Magnusson & Ekman, 1970). On the other hand it is clear that alternative functions could have been fitted to the present data (which was also the case in the earlier studies mentioned). In the present state of affairs no theoretical interpretation can be offered for the equation actually applied nor could that be done for any other function which could have been chosen. Nevertheless, it is now the fourth time equation (1) is approximately descriptive for experimental data; that a simple, regular relation exists between correlation and similarity seems to be clear and maybe we are on our way towards an empirical law.

Estimates of qualitative similarity, expressing the subjects' own perception of overlap between stimuli, and correlation coefficients, indicating the extent to which performance tends to covary over subjects, are basically of a different nature. As has been said, no simple model is available to account for the obtained relation between the two variables. However, estimates of qualitative similarity might be influenced by the perception of the difficulty of the tests, though they did not appear to be related to performance scores (see

Bratfisch & Ekman, 1969; Bratfisch, 1971). One of the major topics of the present study was to investigate this problem. Median estimates of qualitative similarity have been plotted against median similarity estimates with regard to perceived difficulty in Fig. 2A (cf Tables 1A and 1B). Fig. 2B shows median similarity estimates with regard to perceived difficulty plotted against coefficients of correlation (cf Table 1B).

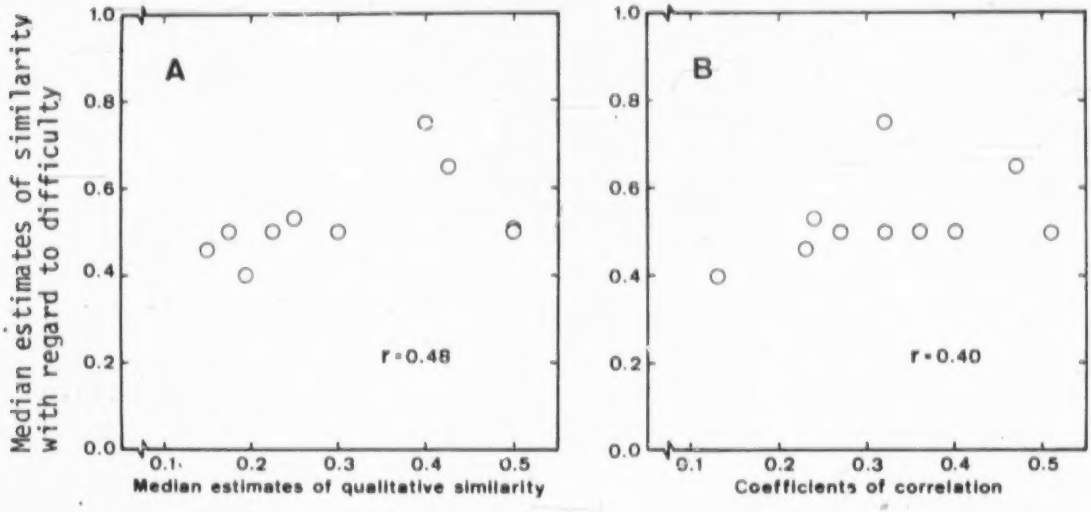

Fig. 2. Similarity estimates with regard to difficulty as related to qualitative similarity estimates (Diagram A) and coefficients of correlation (Diagram B).

No curved trend can be noticed in either of the graphs of Fig. 2; hence, coefficients of correlation have been computed. They are 0.48 for the data in Fig. 2A and 0.40 for the data in Fig. 2B. Both coefficients are of course not significant, due to the small number of observations, but turned out to be by and large descriptive for individual data. Nevertheless, if we accept these statistics at their face value, interesting additional computations can be carried out.

The relation between estimates of qualitative similarity and intertest correlation, previously described by Equation (1), can also be stated in correlational terms, the coefficient of correlation then being 0.79. Now, knowing the correlation between intertest correlation and similarity with regard to difficulty (0.40) as well as the correlation between estimates of qualitative similarity and similarity with regard to difficulty (0.48) we can quantitatively express the proportion overlap which results from the effect of similarity with regard to difficulty of the correlation of 0.79 between intertest correlation and estimates of qualitative similarity. We simply remove the effects of similarity with regard to difficulty by calculating the partial coefficient of correlation, which turns out to be 0.74. The proportion overlap which results from the effects of similarity with regard to difficulty is then $(0.79)^2 - (0.74)^2 = 0.0765$. We could also say that the percentage of the total covariation between intertest correlation and estimates of qualitative similarity present

resulting from the effect of similarity with regard to difficulty is $(0.0765/0.79^2) = 12$ percent; the remaining 88 percent of the association results from other factors. Thus perception of the difficulty of the tests seems to have had but minor effects on the obtained relation between intertest correlation and qualitative similarity.

The estimates of similarity have also been related to performance scores in the same way as has been done previously (Ekman & Bratfisch, 1969; Bratfisch, 1970) where it was found that judged qualitative similarity was not affected by the individual difficulty of the tests; however, it would be plausible if estimates of similarity with regard to difficulty were affected. For each subject and each pair of tests, the difference (disregarding sign) between the two standard scores on the test was calculated and related to estimates of similarity. Table 2A shows such data for estimates of qualitative similarity and Table 2B shows data for estimates of similarity with regard to difficulty.

Table 2A. Frequency of individual estimates of qualitative similarity as related to individual differences between standard test scores.

Standard score	Estimates of qualitative similarity										
difference	0.05	0.15	0.25	0.35	0.45	0.55	0.65	0.75	0.85	0.95	N
0	3	3	2	3	3	4	2	7	1	3	31
1	19	10	7	3	1	3	4	2	6	2	57
2	15	3	5	2	4	8	7	1	5	4	54
3	8	3	6	1	4	2	3	4	0	2	33
4	6	3	4	2	4	5	2		0	2	28
5	3	2					1		1	1	8
6	4	3									7
7	1	1									2
8	0	0									0
	59	28	24	11	16	22	19	14	13	14	220

Table 2B. Frequency of individual estimates of similarity with regard to difficulty as related to individual differences between standard test scores.

Standard score	Estimates of similarity with regard to difficulty										
difference	0.05	0.15	0.25	0.35	0.45	0.55	0.65	0.75	0.85	0.95	N
0		1	2	6	2	5	2	4	3	7	32
1	1	3	3	4	7	9	11	6	5	6	55
2		2	9	8	7	9	4	6	2	6	53
3	1	2	3	2	1	7	5	5	2	4	32
4	1	1	8	2	3	4	2	2	3	2	28
5	1	2	1		1	1		1		1	8
6		1	1	1	2	2		1	1		9
7			1			1					2
8			1								1
	4	12	29	23	23	38	24	25	16	26	220

Table 2A reflects the same results that have been obtained previously; there is practically no trend of similarity decreasing with increasing performance difference. Surprisingly enough there is only a very weak tendency for estimates of similarity with regard to perceived difficulty to covary with differences in performance scores; the data in Table 2B are nearly as randomly distributed as the data in Table 2A.

Estimated test difficulty

When comparing the scale values of the five tests applied in indirect scaling with the corresponding scale values obtained by direct scaling in Table 2, a very close correspondence can be noticed. In fact, the coefficient of correlation between the two sets of data is 0.99. Hence it may be concluded that the category scaling applied yielded an interval-scale provided that the assumptions on which Thurstone's Case V rests are fulfilled.

When comparing the mean estimates of test difficulty with the corresponding mean test performance (cf Table 2) no tendency can be noticed that estimated difficulty decreases with increasing test scores. The restriction of the range of the performance continuum (to qualify as a subject a minimum average performance score of stanine 5 was required) is probably the main reason for that. Moreover, the size of the experimental group was too small to distinguish between subjects scoring relatively low and relatively high on a certain test, which would have been the way to illuminate the relation between estimated test difficulty and test performance. For such an analysis a larger group of, say, at least 50 subjects heterogeneous with respect to performance will be needed.

Discussion

The primary aim of the present investigation was to illuminate the relation between estimates of perceived qualitative similarity and estimates of similarity with regard to perceived difficulty of intelligence tests. This aim was guided by the endeavour to unveil the influence of similarity with regard to difficulty on the perception of qualitative similarity, which had been found to be closely related to intertest correlation. A relatively low correlation between the two subjective variables of 0.48 was found, which is statistically not significant. However, when taking this correlation at its face value the influence of similarity with regard to difficulty on the relation between estimates of qualitative similarity and intertest correlation, based on performance, could be isolated. The percentage of the total association between intertest correlation and estimates of qualitative similarity present ($r = 0.79$) resulting from the effect of similarity with regard to perceived difficulty turned out to be as low as 12 per cent.

The findings of two earlier studies on this topic, namely the close correspondence between estimates of qualitative similarity and intertest correlation expressed by a power function with an exponent of 2.0, could in a way be confirmed in the present study. The influence of perceived difficulty appears to have only minor effects on the obtained relation between these two psychologically fundamentally

different variables; however, there is still no simple model available to account for it. Generally speaking it can be stated relatively accurately that such common elements that produce positive performance correlations also account for the overlap expressed by the estimates of qualitative similarity.

A few words should be said about the dimensionality of the estimates of qualitative similarity. In the two earlier studies on this topic (Bratfisch & Ekman, 1969; Bratfisch, 1971) a very close agreement between the "subjective" factor matrix, based on estimates of qualitative similarity and the "objective" factor matrix, based on inter-test correlations, was obtained. With only five tests available in the present study it would be psychologically less significant to apply factor analysis to data. However, when comparing estimates of qualitative similarity of the present study with the corresponding ones of the two studies mentioned a high conformity could be noticed. Thus, it may be concluded that the underlying dimensionality of the estimates of qualitative similarity of the present study with high probability is identical with the one obtained in the earlier studies.

The question whether or not estimates of difficulty of a whole intelligence test also are linearly related to objective performance as are estimates of difficulty of individual tasks, which was found in earlier studies, could not be answered properly through the present study. This is probably due to the restriction of the range of the performance continuum present. In spite of the fact that subjects could not be differentiated according to performance it is interesting to notice that subjects did perceive pronounced differences in the difficulty of the tests. Tests of perceptual speed were judged as relatively most easy and tests of spatial ability were estimated as relatively most difficult. It would be worthwhile to study the problem of the perception of total test difficulty in future research with larger and more heterogeneous groups of subjects.

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Abstract card

Bratfisch, O. Experienced intellectual activity and perceived difficulty of intelligence tests. Reports from the Institute of Applied Psychology, the University of Stockholm, 1972, No. 30. - A battery of 10 intelligence tests was administered to 22 subjects under standard conditions. After the testing session the degree of perceived similarity between 5 tests of the battery was to be estimated with regard to (a) the kind of intellectual activity required by the tests and (b) difficulty. Estimated qualitative similarity (according to (a) above) was found to be a simple function of intertest correlation as determined from another group of 128 subjects. A correlation of 0.48 was found between estimates of qualitative similarity and similarity with regard to perceived difficulty and a correlation of 0.40 between the latter similarity variable and intertest correlation. When removing the effects of similarity with regard to perceived difficulty on the correlation between intertest correlation and estimated qualitative similarity ($r = 0.79$), a partial coefficient of correlation of 0.74 was yielded, indicating that perceived difficulty accounts for only 12 per cent of the association of 0.79 present.

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